

IPCC FOURTH ASSESSMENT REPORT 2007

INITIAL ANALYSIS AND SUMMARY AND QUESTIONS TO THE IPCC REGARDING THE SUMMARY FOR POLICY MAKERS

By

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IPCC FOURTH ASSESSMENT REPORT 2007 ANALYSIS AND SUMMARY

FIGURES in the final draft of the UN's fourth five-year report on climate change show that the previous report, in 2001, had overestimated the human influence on the climate since the Industrial Revolution by at least one-third.

Also, the UN, in its 2007 report, has cut its high-end best estimate of the rise in sea level by 2100 from 3 feet to less than 2 feet. It suggests that the rate of sea-level rise is up from 2mm/yr to 3mm/year – no more than one foot in a century.

UN scientists faced several problems their computer models had not predicted. Globally, temperature is not rising at all, and sea level is not rising anything like as fast as had been forecast. Concentrations of methane in the air are actually falling.

The Summary for Policymakers was issued February 2, 2007, but the report on which the Summary is based was not published until May. This strange separation of the publication dates has raised in some minds the possibility that the Summary (written by political representatives of governments) was taken as a basis for altering the science chapters (written by scientists, and supposedly finalized and closed in December 2006).

The text of the science chapters reveals that the tendency of computers to over-predict rises in temperature and sea level has forced a major rethink.

The report's generally more cautiously-expressed projections confirm scientists' warnings that the UN's heavy reliance on computer models had exaggerated the temperature effect of greenhouse-gas emissions.

Previous reports in 1990, 1995 and 2001 had been progressively more alarmist. In the final draft of the new report there is a change in tone. Though carbon dioxide in the air is increasing, global temperature is not.

Figures from the US National Climate Data Center show 2006 as about 0.03 degrees Celsius warmer worldwide than 2001. Since that is within the range of measurement error, global temperature has not risen in a statistically significant sense since the UN's last report in 2001.

Sources at the center of the drafting say that, though the now-traditional efforts are being made to sound alarmist and scientific at the same time, key projections are being quietly cut.

One says: "Stern is dead. The figures in the final draft of the UN's *Fourth Assessment Report* makes the recent report of your Treasury's chief economist on the cost of climate change look like childish panic."

The UN's 2001 report showed that our greenhouse-gas emissions since 1750 had caused a "radiative forcing" of 2.43 watts per square metre. Our other effects on climate were shown as broadly self-cancelling.

In the current draft, the UN has cut its estimate of our net effect on climate by more than a third, to 1.6 watts per square metre. It now thinks pollutant particles reflecting sunlight back to space have a very strong cooling effect.

As a deterrent to direct comparisons between the two reports, the key table of "radiative forcings" – the list of human influences on the amount of heat-energy in the atmosphere – has been rotated by 90 degrees compared with the 2001 table.

The UN also uses a 90% "confidence interval" rather than the 95% interval that is normal statistical usage. This has the effect of giving the UN's projections a misleading appearance of greater certainty.

The UN's best estimate of projected temperature increase in response to CO₂ reaching 560 parts per million, twice the level in 1750, was 3.5C in the 2001 report. Now it is down to 3C.

The 2007 draft concludes that it is very likely that we caused most of the rise in temperatures since 1940. It does not point out that for half that period, from 1940 to 1975, temperature actually fell even though carbon dioxide rose monotonically – higher every year than the previous year.

Of the UN's six modeled scenarios, three are extreme exaggerations. Two assume that population will reach 15bn by 2100, though demographers say population will peak at 10bn in 40 years and then plummet. The UN's high-end temperature projection to 2100, up from 5.8C to 6C, is based on these extreme and unrealistic scenarios.

The new report confirms the finding of the 2001 report that global warming will have little effect on the number of typhoons or hurricanes, though it may increase the intensity of some storms a little. However, updated research shows that wind-shear effects largely cancel this intensity.

Computer models heavily relied on by the UN did not predict the considerable cooling of the oceans that has occurred since 2003 – a cooling which demonstrates that neither the frequency nor the intensity of the hurricanes in the year of Katrina was attributable to "global warming".

The UN's models also failed to predict the halt to the rise in methane concentrations in the air that began in 2001. And they did not predict the timing or size of the El Nino which hiked temperature in 1998. Without it, the satellite record shows little or no greenhouse warming. Land-based temperature records may accordingly overstate the problem.

Likewise the UN's models have recently been found to have over-projected the observed rise in sea temperatures, which has had to be corrected downward to allow for over-reading by incorrectly-calibrated instrumentation.

The UN's draft *Summary for Policymakers* contains no apology for the defective and discredited "hockey-stick" graph that erroneously abolished the warm climate of the Middle Ages, arousing in some minds the suspicion that the intellectual honesty of the IPCC process is deficient.

Ambiguities in the report, and considerable discrepancies between it and its predecessor, show that there is no scientific consensus on many points for which consensus is often claimed.

Overall, however, the report is drafted so as to allow environmental extremists to cite its high-end projections as evidence of the need for urgent action.

The ambiguities, together with the conspicuous failure to apologize for the discredited “hockey-stick” graph, fully justify the decision of fast-developing third-world countries such as China and India not to yield to pressure from the EU at the recent Nairobi climate summit to cut their greenhouse-gas emissions.

China, with 30,000 coal mines, is opening a new pit every week and a new coal-fired power station every five days until 2012. Well before then, China will overtake the US as the world’s largest emitter of greenhouse gases.

Even if a country the size of Britain were to shut down and cease using energy or cars altogether, the growth in carbon emissions in China would more than make up for our sacrifice long before the Kyoto agreement expires in 2012.

Even if the US were to shut down its entire economy, growth in emissions from fast-emerging new polluters such as China, India, Indonesia, Russia, and Brazil would replace the US emissions within the next quarter of a century.

The Intergovernmental Panel on Climate Change of the UN approved the complete report for publication at its 36th session, in Bangkok, Thailand, in May 2007.

In the meantime, there will be continuing pressure from a small but vociferous body of politicized scientists, bureaucrats, and lobby groups to suggest that the 2007 report is more alarming than its predecessors. However, the sharp downward revisions in the values of the two central variables – the human contribution to warming compared with 1750 and the projected rise in sea level to 2100 – indicates that the UN has come to appreciate the dangers that would have arisen if it were to have persisted in its former exaggerations.

The “consensus” clique are displeased at the UN’s new-found moderation, particularly in its slashing of its upper-bound projection of the rise in sea level to 2100. But it was they who formerly insisted that the UN, with 2,000 participating scientists, represented the very heart of the “consensus”. Accordingly they find themselves unable convincingly to repudiate the findings of a body whose work they have hitherto represented to us as sacrosanct.

Though the mass media are now well-programmed to focus on the more alarmist aspects of the report, the halving of the sea-level projection is in effect a declaration, from the heart of the “consensus”, that the consequences of warmer worldwide weather will be minor and may be beneficial, that the worst scenarios are no longer probable, and that the panic is officially over.

Summary of the Summary

What the UN said – and what it ought to have said

Main points from the 2007 Summary for Policymakers are in *italics*. Comments are in **bold face**.

UN: Equilibrium global average warming if carbon dioxide is stabilized at 550 parts per million is very likely to be between 1.5° and 4.5°C and likely to be at least 2°C above 1750 values. Best estimate is 3°C.

CM: “Equilibrium” temperature will occur at least 100 years after stabilization. By then, oil and gas are likely to have become scarcer. Also, much of the forecast warming has already occurred. Perhaps as little as 0.6C of further warming will occur at CO₂ doubling.

UN: To 2025, a warming of about 0.2°C per decade is projected. Half would have occurred even if concentrations had been stabilized at year 2000 levels, because of slow ocean response.

CM: Temperature stopped rising in 2001. “Slow ocean response” means the sea, 1100 times denser than air, is taking up much of the heat. If so, we have more time and less of a problem than had been thought.

UN: Since the 1990 report, projections have suggested global temperature increases of 0.15 to 0.3°C per decade for 1990 to 2005. 0.2°C per decade has been observed.

CM: The outturn is actually 0.16C (1990-1999), right at the lower end of the UN’s projections. The outturn for 2000 to 2010 will probably be 0.18C.

UN: Projected sea level rise for 2090-2099 v. 1980–1999 is 7.5 to 17 inches, two-thirds from thermal expansion, one-third from melting polar ice.

CM: The reference period should be a decade, not 20 years, and should be the most recent decade, reducing the projection by 10-15%. The rate of increase in sea level has changed little in 80 years.

UN: Ice-cores suggest more carbon dioxide and methane in the air now than in 650,000 years. Increases since 1750 are chiefly from use of fossil fuels, farming, deforestation and other changes in our land use.

CM: The central question is this: “By how much will the increases in greenhouse gases cause temperature to rise?” On the answer to that question, there is no scientific consensus at all.

UN: Atmospheric carbon dioxide, the most important greenhouse gas we emit, rose from 280ppmv in 1750 to 379ppmv in 2005.

CM: Even if the UK stopped using energy, cars or industry altogether, world temperature by 2035 would be just 0.006C less than if we carry on as usual.

UN: There is very high confidence that our global net effect since 1750 has been warming of 1.6 watts per square metre, likely to have been at least five times greater than that due to changes in solar output.

CM: Just six years ago, the UN said our global effect since 1750 had been 2.43 watts per square metre. Since temperature has failed to rise as fast as predicted, this estimate has had to be slashed by a third.

UN: The combined radiative forcing arising from increases in the major greenhouse gases is +2.3 Wm⁻². The rate of increase since 1750 is very likely to have been unprecedented in more than 10,000 years.

CM: Mere lack of precedent does not in itself imply a problem. The greenhouse-gas forcing of 2.3 Wm⁻² is lower than the 2.43 Wm⁻² in the 2001 report, and the net forcing of 1.6 Wm⁻² is down by a third.

UN: The CO₂ radiative forcing increased by 20% during the last 10 years (1995–2005), the largest change observed or inferred for any decade in at least the last 200 years.

CM: The figure is actually 17%. China is opening a new coal-fired power station every five days until at least 2012. Within two years, China will emit more CO₂ than the US.

UN: Aerosol emissions, chiefly sulphate, organic carbon, black carbon, nitrate and dust, are thought to produce a total direct radiative forcing of -0.5 Wm⁻², and an indirect cloud albedo forcing of -0.7 Wm⁻².

CM: The climate feedback from pollutant aerosols cuts the UN's estimate of our influence on climate since 1750 by a third, from 2.43 to just 1.6 watts per square metre.

UN: Changes in solar output since 1750 are estimated to have caused a radiative forcing of +0.12 Wm⁻², down from +0.3 Wm⁻² in the 2001 report.

CM: Published papers by solar physicists since the previous UN report suggest that the Sun could have had a much larger influence than this – and could have caused more than two-thirds of observed warming. Solar activity is expected to decline for the next 50 years.

UN: Warming of the climate system is unequivocal, evident from increases in global average air and ocean temperatures, melting of snow and ice, and rising sea level.

CM: The fact of warming tells us nothing of the cause. Correlation does not necessarily indicate causation. The world's ice mass has grown in the past 30 years. Recent fluctuations in the rate of increase in sea level are not unusual compared with the fairly recent past.

UN: Eleven of the last twelve years rank among the 12 warmest years since 1850. The trend from 1906 to 2005 of 0.74°C is larger than the 2001 report's trend from 1901–2000 of 0.6°C.

CM: The start date has been brought forward five years. From 1900 to 1905 the temperature fell. Thus the trend has changed little. Also, the UN's figures are from unreliable surface readings that do not always conform with satellite readings.

UN: The average rate of warming over the last 50 years (0.13°C per decade) is nearly twice that for the last 100 years.

CM: The UN only obtains this result because between 1940 and 1975 temperature fell. In fact, between 1910 and 1930 the average rate of warming also was 0.13C, so the rate in the past 50 years is not unprecedented.

UN: New analyses of balloon and satellite measurements of atmospheric temperature show warming rates that are similar to the surface, largely reconciling a previous discrepancy.

CM: The records only match if the El Nino event of 1998 is taken as part of the trend. Without it the satellite measurements show less warming than the surface, where warming is said to be occurring but may not be.

UN: Atmospheric water vapour content has increased since the 1980s over land and ocean as well as in the upper troposphere. The increase is broadly consistent with the extra water that warmer air can hold.

CM: The result of the more humid atmosphere is a substantial greening of the fringes of the Sahara, which has shrunk by 300,000 square kilometers in the past 20 years.

UN: Observations show that the average temperature of the global ocean has increased to depths of at least 3000m and that the ocean has been absorbing most of the heat added to the climate system.

CM: Ocean temperature has been falling recently. Models over-project sea surface temperatures and only match observation if averaged to a very great depth, where temperature has not changed.

UN: Warming that causes seawater to expand may have contributed 0.42mm a year to the average sea level rise from 1961 to 2003, and 1.6mm a year from 1993 to 2003.

CM: There is no hard evidence for any increase in thermosteric expansion of the sea. Leading scientists say the rate of increase in sea levels has not changed in 80 years.

UN: Mountain glaciers and snow have declined. Decreases in glaciers and ice caps (not counting Greenland and Antarctica) caused sea level to rise by 0.50mm a year (1961-2003) and 0.77mm a year (1993-2003).

CM: Mountain glaciers account for less than 5% of the world's ice. Ice mass in Greenland and Antarctica (95% of the world's ice) has grown in the past 30 years, compensating for loss of mountain ice.

UN: There is high confidence that the rate of observed sea level rise increased from the 19th to the 20th century, and the total 20th century rise is estimated to be 0.17m.

CM: Sea level has been rising for thousands of years. In the past century it rose just six and a half inches – less than a sixteenth of an inch a year. The rate of increase has been constant since 1922, though the UN says it has been rising a little recently.

UN: Numerous changes in climate have been observed at the scales of continents or ocean basins. These include wind patterns, precipitation, ocean salinity, sea ice, ice sheets, and aspects of extreme weather.

CM: Climate has always changed, because it is what mathematicians call a “chaotic object”. Behaviour of chaotic objects cannot be predicted, but is capable of changing suddenly in any direction.

UN: Arctic temperatures rose twice as fast as the global average since 1905. However, Arctic temperatures are very variable. A warm period was observed from 1925 to 1945.

CM: The Arctic warm period from 1925 to 1945 mentioned by the UN was actually warmer than the present by as much as 1 degree Celsius. The polar bears thrive, and still thrive. Most researches show the Antarctic is cooling.

UN: Satellite data since 1978 show that annual average Arctic sea ice extent has shrunk by 2.7% per decade, with larger decreases in summer of 7.4% per decade.

CM: Almost all the Arctic is sea-ice. There was almost certainly less Arctic sea-ice in the early 1940s than there is now, and there may have been none in Summer in the middle ages.

UN: Shrinkage of Greenland and Antarctic ice sheets contributed 0.41mm a year to sea level rise from 1993 to 2003. Some Greenland and Antarctic outlet glaciers are draining interior ice faster than before.

CM: During the past 30 years, both Greenland and Antarctica have gained ice mass. In the 10 years from 1993 to 2003, the Greenland ice sheet grew an average extra thickness of 2 inches a year.

UN: Arctic permafrost surface temperature has risen up to 3°C since the 1980s. The maximum area covered by seasonally frozen ground has decreased by about 7% in the Northern Hemisphere since 1900.

CM: The bones of woolly mammoths and other creatures are found in the thawing permafrost, showing that it was not always frozen. Scares about release of methane from permafrost have proven false.

UN: There has been more rain since 1900 in the eastern Americas, northern Europe and northern and central Asia; less in the Sahel, Mediterranean, southern Africa and parts of S. Asia.

CM: There has been no net change in average world rainfall for 100 years. Likewise, the pattern of monsoons, vital to prevent droughts, has remained unchanged.

UN: Since the 1970s there have been longer, harder droughts partly caused by warming and less rain, particularly near the Equator. Warmer seas and less snow cover also suggest droughts.

CM: Records such as those for Moon Lake in the US show that the frequency and severity of droughts has decreased in the past 1,000 years and in the past 50 years. The Sahara is greening fast.

UN: There is no trend in the number of tropical cyclones. Satellites suggest more intense tropical cyclones since 1970, correlated with warmer seas. Cyclone data, particularly pre-1970, are questionable.

CM: The annual number of hurricanes has in fact been declining steadily over the past 50 years. The hurricane season that included Katrina was exceptional, but had precedents 70 years ago and in 1821.

UN: Paleoclimate suggests recent warming is unusual. Past warming has shrunk ice sheets and raised sea level. Recent studies show more variable Northern Hemisphere temperatures than the 2001 report.

CM: The UN casts doubt upon the integrity of its climate change reports by failing to apologize for the defective and now-discredited “hockey-stick” graph of world temperatures since 1000 AD.

UN: Warmer periods during the past 1,000 years have fallen within the uncertainty range given in the 2001 report.

CM: The uncertainty range was so large as to be meaningless. A growing number of scientific papers attest to a mediaeval warm period warmer than the present.

UN: Average Northern Hemisphere temperatures during the second half of the 20th century were very likely warmer than in the last 500 years and likely the warmest in at least the past 1300 years.

CM: In some places, the Middle Ages were up to 3C warmer than today. There is evidence from scientific papers worldwide that the warm period in the middle ages was global.

UN: It is very likely that we caused most of the world temperature rise since 1950. Our influence now extends to continental temperatures, atmospheric circulation patterns, and some extremes.

CM: UN temperatures for the USA and China disagree with those published locally. Temperature in New Zealand has scarcely risen for 50 years. Some Russian figures for the past 15 years are missing.

UN: It is likely that greenhouse gases alone would have caused more warming than observed because volcanic and manmade pollutants have offset some warming.

CM: Most of the warming arises from the increased frequency of El Nino events in recent years. Volcanic aerosols only have a temporary effect.

UN: Snow cover is projected to contract. Widespread further thawing is projected over most permafrost regions. Sea ice may shrink at both poles. Arctic late summer sea ice may largely disappear by 2100.

CM: The projections are speculative. There may have been little sea ice at the North Pole in the middle ages. Some solar physicists think warming may lessen in 20 years as the Sun enters a less active phase.

UN: Typhoons and hurricanes may decrease but their intensity is expected to increase, with higher wind speeds and heavier rain. Models did not predict the increase in intense storms since 1970.

CM: There has been a steady decrease in hurricanes since 1970. Dr. Landsea, a UN author, resigned when his lead author, on a political platform, announced that hurricanes had become more frequent.

UN: Global warming and sea level rise may continue for centuries even if greenhouse gas emissions are stabilized. Stabilization in 2100 may lead to further warming of 0.5C, mostly before 2200.

CM: There is no reason to project a significant acceleration in the rate of increase in sea level at all, or of temperature more than a century after stabilization. Projections are based on modeling, not on evidence.

UN: If CO₂ forcing were stabilized in 2100, thermal expansion alone would raise sea level 0.3 to 0.8m of sea level rise by 2300 relative to 1980–1999) and would continue at decreasing rates for many centuries.

CM: Initial calculations suggest that, as Professor Richard Lindzen and others hypothesize, equilibrium climate response may be intra-annual rather than supra-centennial.

UN: The shrinking Greenland ice sheet may continue to contribute to sea level rise after 2100. Warming since 1750 of 1.9 to 4.6°C may melt almost all of it, raising sea level by 7m if sustained for millennia.

CM: These speculations are unfounded. Arctic temperatures undergo periodic changes. Even if sea level were to rise 23ft over millennia, annual costs for defenses would be small.

UN: The Antarctic ice sheet may remain too cold for widespread melting and may gain mass from increased snowfall, but net loss of ice mass may occur if dynamical ice discharge dominates the ice-mass balance.

CM: In the past 30 years the mass of the Antarctic ice-sheet has grown, reversing a 6,000-year melting trend. Antarctica contains 90% of the world's ice, and growing.

UN: Our CO₂ emissions to 2100 will contribute to warming of the atmosphere and to sea level rise for more than 1000 years.

CM: After the warming in the first 100 years, oil and gas will have become too expensive for mass use. Very little additional warming caused by fossil-fuel use will occur in the subsequent millennium.

UN: Computer simulations that include only natural forcings do not simulate the warming observed over the last three decades.

CM: The UN's simulations omitted the important El Niño ocean oscillation which has been more prominent in recent years, and underestimated urban heat-island effects: thermometers are mostly near towns.

QUESTIONS ABOUT THE IPCC'S SUMMARY FOR POLICYMAKERS, 2007

[**SPPI Note:** the following questions were sent to the IPCC early in the year, prior to release of the final report.]

[**Monckton Note (7-15-07):** It should be explain that the UN, as a result of my questions, corrected Table SPM0, in which it had multiplied the projected contributions of the Greenland and West Antarctic ice-sheets tenfold by the ingenious movement of four separate decimal points, and relabelled it Table SPM2, and quietly posted the new version of the SPM without comment on its website. Inferentially, the deliberate exaggeration of the contributions to sea-level rise from these two ice-sheets was done to support Al Gore's wild exaggeration of sea-level rise. Certainly, journalists throughout the world wrote alarmist headlines about sea-level rise, even though the UN had actually cut its top-end projection by at least a third. The same journalists somehow failed to point out subsequently that the UN had made the correction asked for. We should also point out that the UN has not replied giving answers to any of the questions which I sent to it.]

I should be grateful if the IPCC were able to answer the following questions, which will help me to understand the Summary for Policymakers.

1. Why has the Summary for Policymakers been released at least three months before the underlying science chapters, which were declared to have been finalized before the Summary was compiled?
2. Will the science chapters now be revised to conform with the Summary for Policymakers? If so, is it appropriate that the scientists should bring the science into line with the opinions of the political representatives who compiled the Summary, rather than the other way about?

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3. Why does the Summary not mention that there has been little or no increase in methane concentrations since the previous UN report in 2001?
4. In the Third Assessment Report, the anthropogenic contribution from greenhouse gases was estimated at 2.43 watts per square metre, with all other anthropogenic forcings broadly cancelling each other out. In the present report, the anthropogenic greenhouse-gas forcing is said to be 2.3 watts per square metre (a *decrease* of one-eighth despite a rise in CO₂ concentration since 2001), and this falls to 1.6 watts per square metre (less than two-thirds of the 2001 estimate, and

amounting to little more than 1% of the 150-watts-per-square-metre natural greenhouse effect) if the IPCC's new quantifications of all anthropogenic forcings are taken into account. Am I right that the UN had previously overstated total anthropogenic forcings by more than half?

5. If the natural greenhouse effect is taken as $20 - 33C$, is it right to say that the temperature effect of the total anthropogenic increment of 1.6 watts per square metre since 1750 is an increase (over and above natural variability) of no more than 0.21 to $0.35C$?

6. In December 1995 CO₂ concentration at Mauna Loa was 360ppmv, and in December 2005 it was 380ppmv, an increase of 20ppmv, or 5%. Using the UN's CO₂ forcing formula, $dF = 5.3 (C / C_0)$, and taking C_0 as unity, the total radiative forcing from CO₂ to 1995 was $5.3 \ln(360) = 31.20$ watts per square metre (around one-fifth of the natural greenhouse effect). The total CO₂ radiative forcing to 2005 was $5.3 \ln(380) = 31.48$ watts per square metre, an increase of just 1%. Yet the UN says: "The carbon dioxide radiative forcing increased by 20% from 1995 to 2005." One can only reach the published figure by assuming that the natural greenhouse effect does not exist and that the pre-1750 concentration of ~280ppmv produces no natural radiative forcing at all. In that event the figures for 1995 and 2005 respectively are $5.3 \ln(360/280) = 1.33$ watts per square metre and $5.3 \ln(380/280) = 1.62$ watts per square metre, an increase of 22% over the decade. Did the UN mean to say: "The *anthropogenic* carbon dioxide radiative forcing increased by 20% from 1995 to 2005"? If so, the omission of *anthropogenic* is a misleading error, which has led at least one national journalist in the UK to draw inappropriately alarmist conclusions.

7. The decadal increase of 0.29 watts per square metre, multiplied by 0.5 as suggested in ch.6 of the Third Assessment Report, would suggest a temperature increase of 0.145C over the decade 1995-2005 arising from the additional CO₂ forcing and all other forcings and feedbacks. The observed temperature increase from 1994 to 2004 (comparing NCDC five-year means) was 0.29C, suggesting that anthropogenic factors contributed half of the observed warming over the decade. Would the IPCC agree?

8. If half (or 0.145C) of the 1995-2005 increase in temperature was natural, does the UN consider that the entire solar contribution to warming compared with 1750 (now reduced to 0.12 watts per square metre) has occurred in the last decade?

9. The Sun has been more active, for longer, in the past 50 years than in any similar period in at least the past 11,400 years (Solanki, Usoskin *et al.*, 2005). Therefore, is it appropriate to assume as little as 0.12 watts per square metre of solar forcing compared with 1750?

10. The Sun's activity in 1750 was not far short of recent levels. It then passed through several minima of which the last ended 100 years ago. How much of the increase in temperature over the past century does the IPCC attribute to the increase of 4 watts per square metre at top of atmosphere (0.7 watts per square metre or 0.35C at the surface) in solar activity since 1906?

11. Why does the Summary for Policymakers fail to mention the growing number of results from around the world suggesting that the Sun is about to enter a profound cooling phase that may last most of this century?

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12. The IPCC says: "The linear warming trend over the last 50 years (0.13C per decade) is nearly twice that for the last 100 years." But is it not the case that the warming trend over the 1920s and over the 1930s was also 0.13C (NCDC annual means)? Should it not have been made clear that

the 50-year trend is only higher than the 100-year trend because of the pronounced fall in mean global temperature between 1940 and 1975?

13. Where does the Summary for Policymakers mention that in the five years since its previous report global mean surface temperature has not risen at all?

14. The IPCC says that “the ocean has been absorbing more than 80% of the heat added to the climate system.” Does the IPCC mean that mean global land and sea surface air temperature would have risen at least five times as fast as the observed figure if the ocean had not taken up 80% and more of the heat?

15. Since 1961 (taking NCDC 5-year means) global mean land and sea surface air temperature has risen by ~0.485C. Is the IPCC suggesting that this would have been 2.5C but for the absorption of 2C of heat by the oceans?

16. Given that the oceans are 1,100 times as dense as the atmosphere, is it correct to divide the 2C above by 1,100 to arrive at the mean ocean water temperature increase since 1961?

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17. Was Table SPM0 (reproduced below) inserted to the draft following, and because of, the report by the Science Correspondent of the *Sunday Telegraph* to the effect that the UN’s present report cuts the 2001 report’s high-end estimate of the increase in sea level to 2100 by half?

Table SPM-0. Observed rate of sea level rise and estimated contributions from different sources. (5.5, Table 5.3)
[Numbers to be converted to mm per year]

Source of sea level rise	Rate of sea level rise (m per century)	
	1961 – 2003	1993 – 2003
Thermal expansion	0.042 ± 0.012	0.16 ± 0.05
Glaciers and ice caps	0.050 ± 0.018	0.077 ± 0.022
Greenland ice sheets	0.05 ± 0.12	0.21 ± 0.07
Antarctic ice sheets	0.14 ± 0.41	0.21 ± 0.35
Sum of individual climate contributions to sea level rise	0.11 ± 0.05	0.28 ± 0.07
Observed total sea level rise	0.18 ± 0.05 ^a	0.31 ± 0.07 ^a
Difference (Observed minus sum of estimated climate contributions)	0.07 ± 0.07	0.03 ± 0.10

Note:

^a Data prior to 1993 are from tide gauges and after 1993 are from satellite altimetry

18. I am having difficulty in understanding table SPM-0, which I summarize here:

Metres per century	1961-2003	1993-2003
1. Thermosteric expansion	0.042	0.160
2. Glaciers and ice-caps	0.050	0.077
3. Greenland ice-sheets	0.050	0.210
4. Antarctic ice-sheets	<u>0.140</u>	<u>0.210</u>
	<i>0.282</i>	<i>0.657</i>
Sum of individual climate contributions:	0.110	0.280
Observed sea level rise:	0.180	0.310
Difference:	0.070	0.030

The italicized figures, added by me, are the sums of the four individual sources listed. However, in the table as published the totals are considerably less. Please explain.

19. Assuming that the recent increase in the rate of sea level rise is real (but see Morner, 2004), and taking the estimate from the Third Assessment Report that in the 10,000 years of the Holocene interglacial sea level has risen 130m, is it not right that the observed 17cm centennial rate of rise in sea level is around one-seventh of the mean centennial sea-level rise, and that even the higher rate of rise over the past decade is only a quarter of the mean centennial rise over the past 10,000 years?

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20. Where does the Summary for Policymakers mention that the warm period in the Arctic in the 1930s and 1940s was warmer than the present?

21. Where in the Summary does the UN mention the extensive greening of the Sahara, which has lost 300,000 square kilometres of area to vegetation over the past 30 years?

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22. In general, why does the UN mention so few of the beneficial consequences of warming, such as the less cruel temperatures in Northern latitudes, particularly across Siberia?

Page 8

23. Why was the defective “hockey-stick” graph not withdrawn and apologized for in the section on palaeoclimate? The failure of the UN to apologize for this error in the only graph which was printed six times, large and in full colour in the previous report, and the continuing use by the UN of that now-discredited graph in other climate publications, casts doubt on the scientific integrity of the IPCC process.

24. Given the large and growing number of papers in the peer-reviewed literature attesting to the existence of a mediaeval warm period that was 3 or 4C warmer than the present in some places and was discernible in all parts of the globe, what is the basis for the UN’s conclusion that the current warm period is likely to be warmer than the Middle Ages?

Page 9

25. The UN says equilibrium climate sensitivity to a doubling of CO₂ concentrations is 2 to 4.5C, with a best estimate of 3C. The climate forcings listed in the table in the current SPM are insufficient to yield 3C of warming for a doubling of CO₂: accordingly, the UN must be assuming that the feedbacks occurring in response to higher temperature are net positive. Please provide a quantified list of all climate feedbacks used in the UN's calculations, whether positive or negative.

Page 12

26. There is a mention of "increasing acidification of the ocean". However, is it not true that even with the reductions in alkalinity the ocean will remain alkaline rather than acid?

27. "Ongoing increases" of sea surface temperatures are mentioned. But Lyman *et al.* have found that in the past three years sea surface temperatures have fallen (though the Summary for Policymakers does not mention this). Is "ongoing" the appropriate word?

Page 13

28. The UN says "thermal expansion would continue for many centuries ... ". Is it not correct that the expansion beyond 2200 would be measured in small fractions of a metre per century?

29. Since the half-life of CO₂ in the atmosphere is 50-100 years, is it not true that if CO₂ stabilization occurs by 2100 the lingering effects on temperature and sea level in the millennium beyond 2200 will be near-vanishingly small, putting into context the reports mention of effects lasting a millennium after stabilization?

30. Where does the UN draw attention to the fact that, if the Sun grows cooler as is now widely expected among solar physicists, the medium-term effects projected in the Summary for Policymakers will be offset to at least some extent?

Page 14

31. Please state the estimated world population in 2050 and 2100 for each of the scenarios shown on page 14. Most demographers forecast a peaking of world population in 2050, followed by a sharp decline thereafter.

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*Views here expressed are those of the author, and not necessarily those of SPPI.

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